03566436 **Image available**
DISK CACHE SYSTEM

ABSTRACT
PURPOSE: To efficiently use a disk cache memory by providing an **access history
holding part**, and redividing the **inside** of the disk cache memory at every channel in
accordance with the contents of the access **holding part**.

CONSTITUTION: An **access history holding part** 20a **holds** how many times a disk
device 21 in charge of by itself is accessed, and whenever the disk device 21 is accessed,
its value is updated one by one. In such a state, by referring to an **access history** display
part 20a at an arbitrary time, the **access history** information of this disk cache memory 5
is recognized, and based on a result of recognition, a **divided** using area of the disk **cache**
memory 5 is changed. Accordingly, to a channel whose using frequency is always the
highest, the memory area of a large capacity is allocated, and to a channel whose use
frequency is low, a memory area of a small capacity is allocated. In such a manner, the
disk cache memory 5 can be efficiently used.

0010322694 *Drawing available*
WPI Acc no: 2000-637213/**200061**
Related WPI Acc No: 1999-243537; 1999-262633; 1999-262634; 1999-394141; 1999-404079; 1999-478290; 1999-539499; 1999-580107; 1999-590672
XRPX Acc No: N2000-472511
Processing method of commands from host for disk drive, involves starting host or disk side programs based on full or partial cache hit
Patent Assignee: WESTERN DIGITAL CORP (WDIG-N)
Inventor: HICKEN M S; HOWE S M; SOKOLOV D J; SWATOSH T; WILLIAMS J L

Patent Family (1 patents, 1 countries)							
Patent Number	**Kind**	**Date**	**Application Number**	**Kind**	**Date**	**Update**	**Type**
US 6092149	A	20000718	US 1997864525	A	19970528	200061	B

Priority Applications (no., kind, date): US 1997864525 A 19970528

Patent Details				
Patent Number	**Kind**	**Lan**	**Pgs**	**Draw**	**Filing Notes**
US 6092149	A	EN	177	18	

Alerting Abstract US A
NOVELTY - When there is a full cache hit, a host pointer is set to start host side programs. During partial cache bit, prefetch is computed, buffer counter is set and disk side programs are started. The cache control structure is modified suitably after seek or scan completion to indicate condition of cache.

DESCRIPTION - Task control block data structure is initialized for a selected read command from host based on which it is detected whether to seek or scan the cache first. When performing seek first, size and number of the cache segments are adjusted to adapt to commands. Cache entry table is scanned to assign cache segment to the read command to detect the full or partial cache hit by checking whether data requested in command is in cache while performing seeking or scanning.

USE - In hard disk drive with cache system.

ADVANTAGE - The cache system maximizes drive performance by attaining execution of commands based on past **access history** and detecting suitable number of **segments**. By executing internal processes **in** parallel, optimum performance is achieved.

Original Abstract: A magnetic disk drive with a caching system includes an intelligent interface to communicate with a host, a magnetic disk and a cache memory to buffer data transferred to and from the host. The caching system maximizes drive performance based on past access history. The caching system alters execution of commands by coalescing commands or executing internal commands in parallel. The caching system anticipates data requests by using a prefetch to store data that may be requested. The caching system divides the cache memory into segments to store multiple streams of data. The number of segments may be continuously adapted according to the types of access to maximize performance by maintaining a segment for each sequential stream of data. The caching system uses a dynamic priority list to determine segments to maintain and discard. Each segment is monitored to determine access types such as sequential, random, and repeating. The access type determines the amount of data to prefetch and to save, including a minimum and maximum prefetch. The caching system may prescan the cache memory during prefetch to alter the prefetch amount in response to a command request. The caching system may wait for a cache memory access that has not yet occurred. An initiator changes the caching parameters though a mode page.

Claim:

1. In a disk drive having an intelligent interface for communicating with a host, a magnetic disk, host side programs, disk side programs, and a cache wherein the cache is divisible into a number of segments wherein the number of segments may be varied, wherein the cache employs a cache control structure including a cache entry table, a buffer counter, a host pointer and a disk pointer, a method for processing commands from the host comprising:
    o (a) receiving a plurality of commands from the host including a read command;
    o (b) selecting the read command from the plurality of commands;
    o (c) initializing a task control block data structure for the read command;
    o (d) deciding whether to scan the cache first or start a seek first;
    o (e) if scanning the cache first, performing a scan of the cache entry table to assign a cache segment to the read command to determine a full cache hit or a partial cache hit by checking whether data requested in the read command is in the cache, obtaining the disk pointer if there was not a full cache hit, starting a seek if there was no cache hit, computing a prefetch if there was not a full cache hit, setting the buffer counter and starting the disk side programs if there was not a full cache hit, setting the host pointer and starting the host side programs, and setting the cache control structure to a state that represents a condition the cache will be in after the read command has completed; and
    o (f) if starting a seek first, obtaining the disk pointer, starting a seek, adjusting a size of each segment and number of segments in the cache to adapt to commands being processed, performing a scan of the cache entry table to assign a cache segment to the read command to determine a full cache hit or a partial cache hit by checking whether data requested in the read command is in the cache, performing a seek if there was a partial

cache hit, computing a prefetch for the read command if there was not a full cache hit, setting the buffer counter and starting a read of the magnetic disk if there was not a full cache hit, setting the host pointer and starting the host, and setting the cache control structure to a state that represents a condition the cache will be in after the read command has completed.

0015005289 *Drawing available*
WPI Acc no: 2005-353194/200536
Related WPI Acc No: 2004-578818
XRPX Acc No: N2005-288265
Data access provision method in computer system, involves obtaining history cache entry from cache with entries containing mappings between open systems and non-open systems references to locations in data reference
Patent Assignee: EMC CORP (EMCE-N)
Inventor: ALEXANDER J L; BOBER P M; LIANG R

Patent Family (1 patents, 1 countries)								
Patent Number	**Kind**	**Date**	**Application Number**	**Kind**	**Date**	**Update**	**Type**	
US 6889292	B1	20050503	US 2001845385	A	20010430	200536	B	
			US 2004875466	A	20040624			

Priority Applications (no., kind, date): US 2001845385 A 20010430; US 2004875466 A 20040624

Patent Details						
Patent Number	**Kind**	**Lan**	**Pgs**	**Draw**	**Filing Notes**	
US 6889292	B1	EN	25	10	Continuation of application	US 2001845385
					Continuation of patent	US 6766418

Alerting Abstract US B1
NOVELTY - A **history cache** entry is **obtained** from a **history cache** including entries containing mappings between the open systems reference to location in the data reference and the non-open systems reference to location in reference, based on reference. A partition **cache** entry is obtained from a partition **cache** based on reference. The data is accessed based on request **using** a data reference **obtained** from **history**/partition entry.

USE - For providing access to data in data storage system, using computer system connected to internet.

ADVANTAGE - The data access operations are performed within less time easily.

Original Abstract:
Mechanisms and techniques disclose a system that provides access to data using a two part cache. The system receives a data access request containing a first data reference.

such as an open systems request to access data. The system then obtains a history cache entry from a history cache based on the first data reference and obtains a partition cache entry from a partition cache based on the first data reference. Cache entries contain mappings between open systems reference locations and non-open systems references to locations in the data to be accessed. The system then performs a data access operation as specified by the data access request using a second data reference based upon either the history cache entry or the partition cache entry. Upon performance of the data access operation, the system then updates the history and partition caches with new cache entries and can resize the partition and history caches as needed.

Claim:

1. 1. A method for providing access to data, the method comprising the steps of:
   - receiving a data access request containing a first data reference;
   - obtaining a history cache entry from a history cache based on the first data reference, wherein the history cache can include a plurality of history cache entries, each history cache entry containing a mapping between an open systems reference to a location in the data and a non-open systems reference to a location in the data, and each history cache entry being obtained from a former data access operation to the data;
   - obtaining a partition cache entry from a partition cache based on the first data reference; and
   - performing a data access operation on the data as specified in the data access request using a second data reference obtained from one of the history cache entry and the partition cache entry.